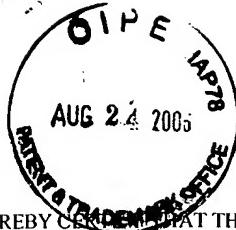
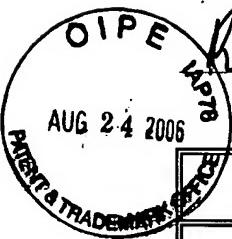


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Cofc



I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED VIA FIRST CLASS MAIL ADDRESSED TO ASSISTANT  
COMMISSIONER OF PATENTS ON: August 22, 2006. Depositor: Robert Faber



Signature &amp; Date

Robert Faber 8/22/06

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
In Re Patent of: Jed H. Rankin, et al.	August 22, 2006
	Examiner: W. David Coleman
Patent No. 7,087,499 Issue Date: August 8, 2006	Group Art Unit: 2823
Title: INTEGRATED ANTIFUSE STRUCTURE FOR FINFET AND CMOS DEVICES	IBM Corporation 2070 Route 52 Dept. 18G, Bldg. 321-482 Hopewell Junction, N.Y. 12533

**REQUEST TO ISSUE A CERTIFICATE OF CORRECTION OF PATENT**  
**UNDER 37 C.F.R. § 1.322**

The Commissioner for Patents  
P.O Box 1450  
Alexandria, Va 22313-1450

Attn: Certificate of Correction Branch

Certificate  
AUG 28 2006  
of Correction

Sir:

Patentees respectfully request issuance of the enclosed Certificate of Correction for the above-referenced U.S. Patent.

Upon review of the issued patent, it was noted that the Patent and Trademark Office failed to include three Applicants in the Patent, even though these Applicants were included in the Declaration and Power of Attorney as originally filed

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and were not deleted therefrom prior to issue. The Applicants that should be added are Kiran V. Chatty, Robert J. Gauthier Jr., and David M. Fried.

Enclosed, please find a copy of the first page of the US Patent No. 7,087,499.

Since the subject matter of this request for Certificate of Correction was incurred through the fault of the Patent and Trademark Office, Patentees respectfully request issuance of the Certificate of Correction in an expedited manner.

No fee is believed to be due for the submission of this request. However, if any fees are required, please charge such fees to Deposit Account No. 09-0458.

Respectfully submitted,



H. Daniel Schnurmann  
Agent for Applicants  
Registration No. 35, 791  
Tel. (845) 894-2481

10/539,333

BUR920020082US1

10/539,333



US007087499B2

(12) **United States Patent**  
Rankin et al.

(10) Patent No.: **US 7,087,499 B2**  
(45) Date of Patent: **Aug. 8, 2006**

(54) INTEGRATED ANTIFUSE STRUCTURE FOR  
FINFET AND CMOS DEVICES

(56) References Cited

U.S. PATENT DOCUMENTS

5,557,136 A	9/1996	Gordon et al.
5,572,062 A	11/1996	Iranmanesh
5,915,171 A	6/1999	Sheu
6,130,469 A	10/2000	Bracchitta et al.
6,413,802 B1 *	7/2002	Hu et al. .... 438/151
6,642,090 B1 *	11/2003	Fried et al. .... 438/164
6,657,259 B1 *	12/2003	Fried et al. .... 257/350
2002/0036290 A1 *	3/2002	Inaba et al. .... 257/66

\* cited by examiner

Primary Examiner—W. David Coleman

(74) Attorney, Agent, or Firm—H. Daniel Schnurmann

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**Wagdi W. Abadeer**, Jericho, VT (US);  
**Jeffrey S. Brown**, Middlesex, VT (US);  
**William R. Tonti**, Essex Junction, VT  
(US)

(73) Assignee: **International Business Machines  
Corporation**, Armonk, NY (US)

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/539,333**

(57) ABSTRACT

(22) PCT Filed: **Dec. 20, 2002**

A method is described for fabricating an antifuse structure (100) integrated with a semiconductor device such as a FINFET or planar CMOS device. A region of semiconducting material (11) is provided overlying an insulator (3) disposed on a substrate (10); an etching process exposes a plurality of corners (111-114) in the semiconducting material. The exposed corners are oxidized to form elongated tips (111t-114t) at the corners; the oxide (31) overlying the tips is removed. An oxide layer (51), such as a gate oxide, is then formed on the semiconducting material and overlying the corners; this layer has a reduced thickness at the corners. A layer of conducting material (60) is formed in contact with the oxide layer (51) at the corners, thereby forming a plurality of possible breakdown paths between the semiconducting material and the layer of conducting material through the oxide layer. Applying a voltage, such as a burn-in voltage, to the structure converts at least one of the breakdown paths to a conducting path (103, 280).

(86) PCT No.: **PCT/US02/41182**

§ 371 (c)(1),  
(2), (4) Date: **Jun. 15, 2005**

(87) PCT Pub. No.: **WO2004/059726**

PCT Pub. Date: **Jul. 15, 2004**

(65) Prior Publication Data

US 2006/0128071 A1 Jun. 15, 2006

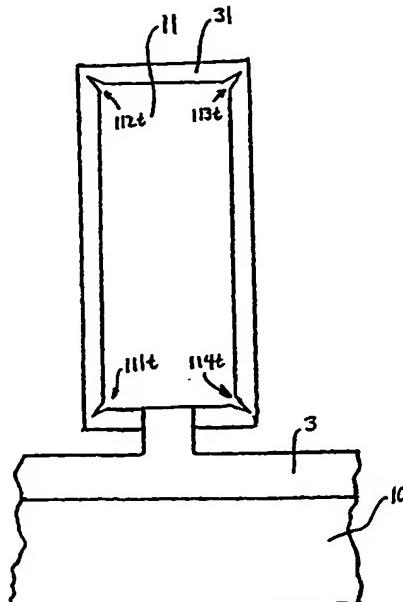
(51) Int. Cl.  
**H01L 21/76** (2006.01)

(52) U.S. Cl. .... **438/412; 257/E21.176;**  
**257/E21.205; 257/E21.283**

(58) Field of Classification Search .... **438/412,**  
**438/431; 257/E21.176, E21.205, E21.283**

See application file for complete search history.

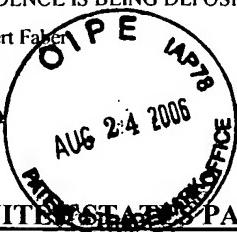
17 Claims, 10 Drawing Sheets



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*Robert Faber 8/22/06*

Signature & Date



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : August 22, 2006

Jed H. Rankin, et al. : Examiner: W. David Coleman

Serial No.: 10/539,333 : Group Art Unit: 2823

Filed: 06/15/2005 : International Business Machines Corporation

Title: INTEGRATED ANTIFUSE  
STRUCTURE FOR FINFET  
AND CMOS DEVICES Dept. 18G/Bldg. 321-482  
2070 Route 52  
Hopewell Junction, NY 12533

REQUEST FOR CORRECTION OF OFFICIAL FILING RECEIPT

Commissioner for Patents  
Alexandria, VA 22313-1450

Sir:

Upon receiving the filing receipt (attached) for the above-captioned patent application, it was noted that three of the Applicants were not listed. The Applicants that should be added are Kiran V. Chatty, Robert J. Gauthier Jr., and David M. Fried. Correction is respectfully requested.

Enclosed , please find a copy of the Official Filing Receipt and Delaration and Power of Attorney.

If any fees are required, the Commissioner is hereby authorized to charge such fees to Deposit Account No. 09-0458.

Respectfully submitted,  
Jed H. Rankin, et al.

By:

*H. Daniel Schnurmann*

H. Daniel Schnurmann  
Registration No. 35,791  
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AUG 22 2006  
LUUD



U.S. PATENT AND TRADEMARK OFFICE  
UNITED STATES PATENT AND TRADEMARK OFFICE

AUG 24 2006

UNITED STATES DEPARTMENT OF COMMERCE  
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P.O. Box 1450  
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APPL NO.	FILING OR 371 (C) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/539,333	06/15/2005	2812	860	BUR920020082US1		10	17

CONFIRMATION NO. 9276

FILING RECEIPT



\*OC000000018216047\*

32074  
INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

HOS

Date Mailed: 03/10/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

Applicant(s)

Jed H Rankin, Richmond, VT;  
Wagdi W. Abadeer, Jericho, VT;  
Jeffrey S. Brown, Middlesex, VT;  
William R. Tonti, Junction, VT;

Power of Attorney: The patent practitioners associated with Customer Number 45600.

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/US02/41182 12/20/2002

Foreign Applications

If Required, Foreign Filing License Granted: 03/06/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US10/539,333**

Projected Publication Date: 06/15/2006

Non-Publication Request: No

Early Publication Request: No

**Title**

Integrated antifuse structure for finfet and cmos devices

**Preliminary Class**

438

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

### **LICENSE FOR FOREIGN FILING UNDER Title 35, United States Code, Section 184 Title 37, Code of Federal Regulations, 5.11 & 5.15**

#### **GRANTED**

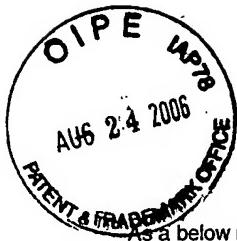
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## Declaration and Power of Attorney for Patent Application

As a below named inventor, I hereby declare that::

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**INTEGRATED ANTIFUSE STRUCTURE FOR FINFET AND CMOS DEVICES**

the specification of which (check one)

is attached hereto.

was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_ and was amended on \_\_\_\_\_

I hereby state that I have reviewed and understand the contents of the above- identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, '1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, '119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**Prior Foreign Application(s):**

Number	Country	Day/Month/Year	Priority Claimed
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I hereby claim the benefit under Title 35, United States Code, '120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, '112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, '1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

**Prior U.S. Applications:**

Serial No.:PCT/US02/41182	Filing Date: 20 December 2002	Status: Completed
---------------------------	-------------------------------	-------------------

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

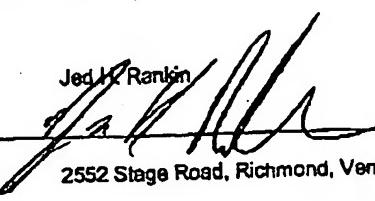
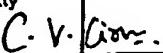
As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Customer No. 45600

Send all correspondence to:  
 Jay H. Anderson, Intellectual Property Law, IBM Corporation,  
 Dept. 18G, Building 321-482, Route 52, Hopewell Junction, New York 12533

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**Declaration and Power of Attorney for Patent Application**

- (1) Inventor: Jed H. Rankin  
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Citizenship: United States Of America  
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BUR920020082US1

**Declaration and Power of Attorney for Patent Application**

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(5) Inventor: William R. Tonti

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AUG 29 2005

## Declaration and Power of Attorney for Patent Application

(1) Inventor: Jed H. Rankin  
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 Citizenship: United States of America  
 Post Office Address: Same as residence

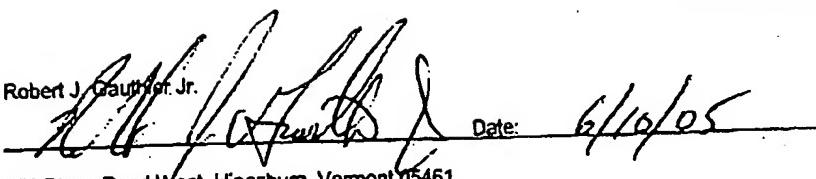
(2) Inventor: Wagdi W. Abadeer  
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(3) Inventor: Jeffrey S. Brown  
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(4) Inventor: Kiran V. Chatty  
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(5) Inventor: William R. Tonti  
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BUR920020082US1

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(7) Inventor: David M. Fried  
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